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EXAMINER

RUDE, TIMOTHY L

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/614,855
Filing Date: July 07, 2003
Appellant(s): ZHANG ET AL.

Richard L. Bell
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 02 June 2008 appealing from the Office action mailed 27 November 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 17, 29, and 33-40.

Claims 2-12, 14-16, 18-28, and 30-32 are withdrawn from consideration as not directed to the elected species.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,275,924	Devonald	1-1994
2002/0075557	Zhang	6-2002
2002/0075420	Zhang (Zhang2)	6-2002
6,556,470	Vincent	4-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 13, 17, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devonald et al (Devonald) USPAT 5,275,924 in view of Zhang et al (Zhang) US PG PUB 2002/0075557 A1.

As to claims 1 and 17, Devonald discloses a method of making a non-centrosymmetric bistable switchable film [(electro-optic memory) col. 9, lines 52-68 and col. 32, line 40 through col. 34, line 17] that is a three-dimensional [col. 10, lines 15-25

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and 50-65] molecular switch assembly, formed on a substrate, said molecular assembly comprising:

a first monolayer of seed molecules for initiating self-assembled molecular growth, said first monolayer formed on said substrate [end of molecule, col. 1, line 54];

a second monolayer of active molecules comprising a plurality of rotor moieties and stator moieties, said second monolayer of active molecules formed on said first monolayer of seed molecules, with a one-to-one correspondence between molecules in said first monolayer and said second monolayer [X as selected from molecules at col. 1, line 60 through col. 2, line 9];

a third monolayer of spacer molecules, formed on said second monolayer of active molecules, with a one-to-one correspondence between molecules in said second monolayer and said third monolayer [other end of molecule, col. 1, line 54]; and

a plurality of alternating second monolayers and third monolayers having said one-to-one correspondence [stacking, col. 10, lines 15-25 and 50-65], wherein said active molecules are switchable between two different states by an applied external electric field [electro-optic memory].

Devonald does not explicitly claim 1) his first stator molecule [connected to substrate] is a “seed” molecule or 2) one rotor moiety supported between two stator moieties.

Devonald teaches 1) that use of the Langmuir-Blodgett technique is superior to electric field pointing in that it produces NLO active species that are aligned in parallel. Examiner considers such a technique to read on Applicant’s “seed” molecule method

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and Applicant's forming "vial molecular self-assembly", especially in view of Devonald's teaching of stacking layers of like or alternate nature [stacking, col. 10, lines 15-25 and 50-65].

Devonald is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to use seed molecules to form ordered layers by the preferred Langmuir-Blodgett technique to produces NLO active species that are aligned in parallel.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with the seed molecule technique to produces NLO active species that are aligned in parallel.

Zhang teaches 2) the use of one rotor moiety supported between two stator moieties [634, both ends, Figure 6], wherein color change occurs through a molecular conformation change that alters the degree of electron conjugation across a said active molecule and, thereby, the highest occupied molecular orbital - lowest unoccupied molecular orbital states of said active molecule [0074], as a preferred structure to be produced by the well known Langmuir-Blodgett technique [0106] to comprise an improved bi-stable switchable film with improved contrast [Abstract].

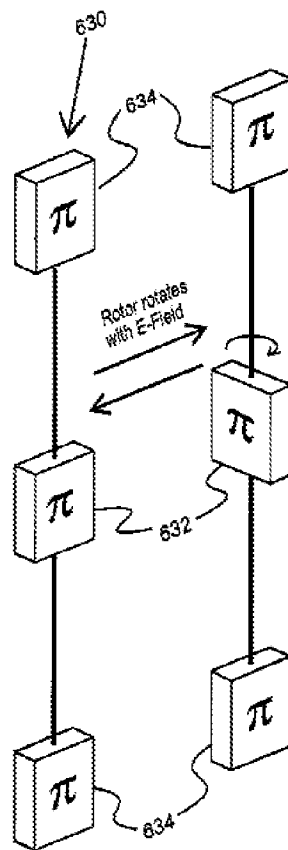


FIG. 6

Zhang is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add the use of one rotor moiety supported between two stator moieties [634, both ends, Figure 6] as a preferred structure to be produced by the well known Langmuir-Blodgett technique [0106] to comprise an improved bi-stable switchable film with improved contrast [Abstract].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with the use of one rotor moiety supported between two stator moieties [634, both ends, Figure 6] of Zhang

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as a preferred structure to be produced by the well known Langmuir-Blodgett technique [0106] to comprise an improved bi-stable switchable film with improved contrast [Abstract].

As to claims 13 and 29, Devonald in view of Zhang teach, as combined above, the three-dimensional molecular assembly of Claim 1.

Devonald does not explicitly teach an assembly wherein said substrate comprises a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer.

Devonald teaches that his films are applicable to electro-optic optical switching devices [col. 9, lines 52-57] with improved optical properties.

Devonald is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add electrodes across the assembly of layers [Applicant's substrate comprises a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer] to comprise an electro-optic optical switching device with improved optical properties.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with a substrate comprising a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer to comprise an electro-optic optical switching device with improved optical properties.

Claims 33-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devonald in view of Zhang, and further in view of Vincent et al (Vincent) USPAT 6,556,470 B1.

As to claims 33-40, Devonald in view of Zhang teach the device above.

Devonald does not explicitly disclose switching between a transparent state and a colored state.

Vincent teaches an electrically rotated molecular bistable switch [Abstract, col. 8, lines 21-44, and col. 12, lines 1-11] that switches between a colored state and a transparent state [Abstract] to comprise a satisfactory field addressable rewriteable media for a plurality of uses [Title and Abstract].

Vincent is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add switching between a colored state and a transparent state as a desirable implementation of a field addressable rewriteable memory for a plurality of uses.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald in view of Zhang with the switching between a colored state and a transparent state of Vincent as a desirable implementation of a field addressable rewriteable memory for a plurality of uses.

As to claims 33-40, Devonald in view of Zhang teach the device above.

Devonald does not explicitly disclose switching between a transparent state and a colored state.

Zhang, as combined above, teaches an electrically rotated molecular bistable switch [Fibure 2a] that switches between a colored [black] state and a transparent state to comprise a satisfactory molecular switch with improved contrast [Abstract].

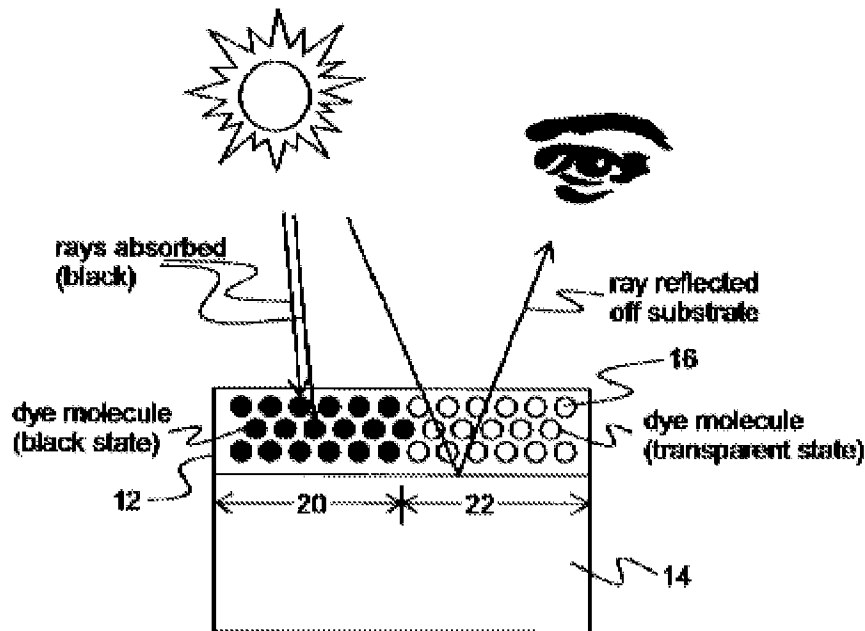


FIG. 2a

Claims 1, 13, 17, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devonald et al (Devonald) USPAT 5,275,924 in view of Zhang et al (Zhang2) US PG PUB 2002/0075420 A1.

As to claims 1 and 17, Devonald discloses a method of making a non-centrosymmetric bistable switchable film [(electro-optic memory) col. 9, lines 52-68 and col. 32, line 40 through col. 34, line 17] that is a three-dimensional [col. 10, lines 15-25 and 50-65] molecular switch assembly, formed on a substrate, said molecular assembly comprising:

a first monolayer of seed molecules for initiating self-assembled molecular growth, said first monolayer formed on said substrate [end of molecule, col. 1, line 54];

a second monolayer of active molecules comprising a plurality of rotor moieties and stator moieties, said second monolayer of active molecules formed on said first monolayer of seed molecules, with a one-to-one correspondence between molecules in said first monolayer and said second monolayer [X as selected from molecules at col. 1, line 60 through col. 2, line 9];

a third monolayer of spacer molecules, formed on said second monolayer of active molecules, with a one-to-one correspondence between molecules in said second monolayer and said third monolayer [other end of molecule, col. 1, line 54]; and

a plurality of alternating second monolayers and third monolayers having said one-to-one correspondence [stacking, col. 10, lines 15-25 and 50-65], wherein said

active molecules are switchable between two different states by an applied external electric field [electro-optic memory].

Devonald does not explicitly claim 1) his first stator molecule [connected to substrate] is a “seed” molecule or 2) one rotor moiety supported between two stator moieties.

Devonald teaches 1) that use of the Langmuir-Blodgett technique is superior to electric field pointing in that it produces NLO active species that are aligned in parallel. Examiner considers such a technique to read on Applicant’s “seed” molecule method and Applicant’s forming “vial molecular self-assembly”, especially in view of Devonald’s teaching of stacking layers of like or alternate nature [stacking, col. 10, lines 15-25 and 50-65].

Devonald is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to use seed molecules to form ordered layers by the preferred Langmuir-Blodgett technique to produces NLO active species that are aligned in parallel.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with the seed molecule technique to produces NLO active species that are aligned in parallel.

Zhang² teaches 2) the use of one rotor moiety supported between two stator moieties [0002] as a related structure, wherein color change occurs through a molecular conformation change that alters the degree of electron conjugation across a said active molecule and, thereby, the highest occupied molecular orbital - lowest unoccupied

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molecular orbital states of said active molecule [0085], to comprise an improved bi-stable switchable film with improved contrast [Abstract].

Zhang2 is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add the use of one rotor moiety supported between two stator moieties [0002] as a related structure to comprise an improved bi-stable switchable film with improved contrast [Abstract].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with the use of one rotor moiety supported between two stator moieties [0002] as a related structure to comprise an improved bi-stable switchable film with improved contrast [Abstract].

As to claims 13 and 29, Devonald in view of Zhang2 teach, as combined above, the three-dimensional molecular assembly of Claim 1.

Devonald does not explicitly teach an assembly wherein said substrate comprises a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer.

Devonald teaches that his films are applicable to electro-optic optical switching devices [col. 9, lines 52-57] with improved optical properties.

Devonald is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add electrodes across the assembly of layers [Applicant's substrate comprises a first electrode and wherein said molecular assembly

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further comprises a second electrode formed on an uppermost monolayer] to comprise an electro-optic optical switching device with improved optical properties.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with a substrate comprising a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer to comprise an electro-optic optical switching device with improved optical properties.

Claims 33-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devonald in view of Zhang2, and further in view of Vincent et al (Vincent) USPAT 6,556,470 B1.

As to claims 33-40, Devonald in view of Zhang2 teach the device above.

Devonald does not explicitly disclose switching between a transparent state and a colored state.

Vincent teaches an electrically rotated molecular bistable switch [Abstract, col. 8, lines 21-44, and col. 12, lines 1-11] that switches between a colored state and a transparent state [Abstract] to comprise a satisfactory field addressable rewriteable media for a plurality of uses [Title and Abstract].

Vincent is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add switching between a colored state and a transparent

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state as a desirable implementation of a field addressable rewriteable memory for a plurality of uses.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald in view of Zhang2 with the switching between a colored state and a transparent state of Vincent as a desirable implementation of a field addressable rewriteable memory for a plurality of uses.

As to claims 33-40, Devonald in view of Zhang2 teach the device above.

Devonald does not explicitly disclose switching between a transparent state and a colored state.

Zhang2, as combined above, teaches an electrically rotated molecular bistable switch [Figure 2a] that switches between a colored [black] state and a transparent state to comprise a satisfactory molecular switch with improved contrast [Abstract].

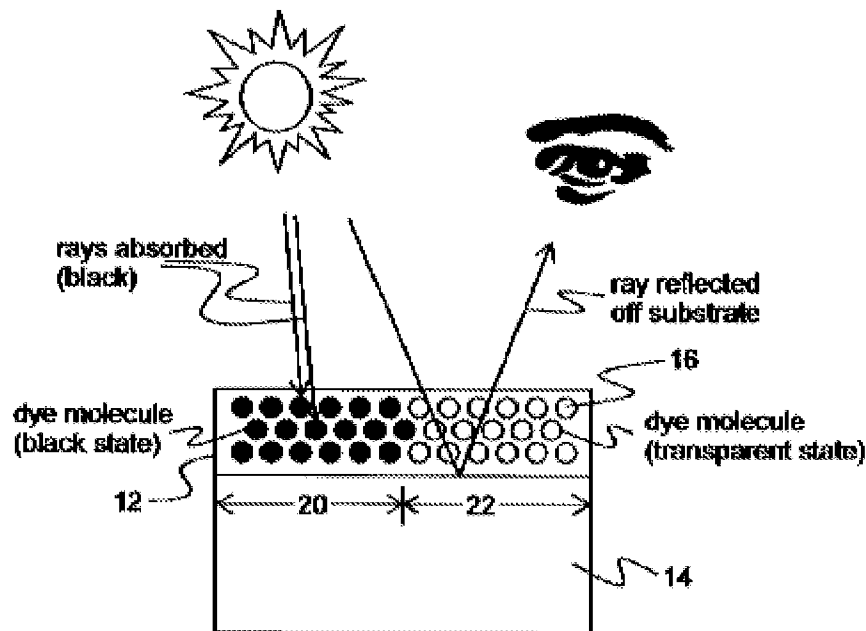


FIG. 2a

(10) Response to Argument

Appellant's argument: ISSUE 1, at page 6 of Brief - Appellant cannot find "seed molecules" for self-assembled molecular growth anywhere in Devonald.

Examiner's response: Examiner does not need to match Applicant's lexicography. The device structure and method step limitations added by Appellant's term "seed molecule" was fully considered met by the applied prior art.

Any molecule that serves for further grow may be called a "seed molecule".

Often in the art, reference is made to “seed crystal”, “seed layer”, or “seed crystal layer” when describing a surface upon which molecular self-assembly is performed.

Langmuir-Blodgett’s films are well known to serve as a “seed molecules”, “seed crystals”, “seed layers”, or “seed crystal layers”. Devonald teaches the device and Langmuir-Blodgett’s method matching the device structure and method step limitations added by Appellant’s “seed molecules” and “molecular self-assembly”.

Since this is a matter of pure lexicography, well known in the art for decades, no reference need be applied; however, for convenience, one may reference (without being applied) Japanese patent publication, document-identifier: JP 63201098 A, 19 August 1988 Tomita et al, Seiko Instruments and Electronics LTD. An on-line search for “seed crystal Langmuir Blodgett” will also provide robust proof that the 27 November 2007 Final Rejection is proper regarding Langmuir-Blodgett’s method matching the device structure and method step limitations added by Appellant’s lexicography of “seed molecules” and “molecular self-assembly”.

Appellant’s argument: at pages 6 and 7 of Brief - Langmuir-Blodgett films assemble using hydrophilic and hydrophobic parts, but the invention is not so limited.

Examiner’s response: Narrow beats broad.

Langmuir-Blodgett's films are specific technology using "seed molecules" to promote "molecular self-assembly". Langmuir-Blodgett's films are species of a genus of technologies using "seed molecules" to promote "molecular self-assembly".

Appellant's argument: at pages 8 and 9 of Brief - the materials of the claimed invention are different from the materials used in Langmuir-Blodgett films.

Examiner's response: One of ordinary skill in the art would know to use compatible "seed molecules" and other materials to promote "molecular self-assembly" because that is pivotal to how all the species technologies of the genus work.

One of ordinary skill in the art would not be confused by disclosure of Devonald when considering the teachings of Zhang.

Appellant's argument: at page 11 of Brief - Examiner has not explained how to combine the materials of Zhang with the materials of Devonald.

Examiner's response: One does not need to combine the materials of Zhang with the materials of Devonald.

One of ordinary skill in the art would know to use compatible "seed molecules" and other materials to promote "molecular self-assembly" because that is pivotal to how all the species technologies of the genus work.

One of ordinary skill in the art would not be confused by disclosure of Devonald when considering the teachings of Zhang.

One of ordinary skill in the art would obviously not retain anything of Devonald that would be incompatible with the molecular self-assembly of Zhang because knowledge of such compatibilities is mainstream to molecular self-assembly technology.

Devonald teaches broadly the use of molecular self-assembly to produce stacking of multiple layers of like or alternate nature [Applicant's "seed molecules" and Applicant's three-dimensional molecular self-assembly] to produce any of a wide range of electrically and non-electrically tunable and switching optical devices [col. 9, lines 53-67].

Zhang teaches the missing material types, method step modifications, and rotor specific limitations with motivation of improved bi-stable switching with improved contrast. The result may be considered a modified Langmuir-Blodgett technique or it may be considered to contrast from traditional Langmuir-Blodgett techniques [lexicography]. Given that Zhang is enabled, one of ordinary skill in the art would have enablement and motivation for a successfully making a device with the rotors of Zhang that would be a modified three-dimensional multi-layered optical device (and method) of Devonald, regardless of the lexicography of whether one wanted to refer to the technique as being a modified Langmuir-Blodgett's technique.

Appellant's argument: at page 12 of Brief - claims 13 and 29 are patentable because they contain electrode specific limitations.

Examiner's response: It is respectfully pointed out that one of ordinary skill in the art knows that two electrodes are needed and that they must be on opposite sides of the switching material. This very well known and intuitive fact is little more than an inherent property of electrical physics. That makes all of the very few possibilities for electrode locations very obvious with great expectation of success.

Appellant's argument: ISSUE 2, at page 13 of Brief - claims 33-40 are patentable because they depend from allowable base claims 1 and 17.

Examiner's response: Claims 33-40 are not patentable because they depend from base claims 1 and 17 that are properly rejected, and the limitations of claims 33-40 are also properly rejected.

Appellant's argument: ISSUE 3, at page 13 of Brief - Appellant cannot find "seed molecules" for self-assembled molecular growth anywhere in Devonald.

Examiner's response: Examiner does not need to match Applicant's lexicography. The device structure and method step limitations added by Appellant's term "seed molecule" was fully considered met by the applied prior art.

Any molecule that serves for further grow may be called a "seed molecule".

Often in the art, reference is made to "seed crystal", "seed layer", or "seed crystal layer" when describing a surface upon which molecular self-assembly is performed.

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Appellant's argument: at pages 14 of Brief - the materials of the claimed invention are different from the materials used in Langmuir-Blodgett films.

Examiner's response: One of ordinary skill in the art would know to use compatible "seed molecules" and other materials to promote "molecular self-assembly" because that is pivotal to how all the species technologies of the genus work.

One of ordinary skill in the art would not be confused by disclosure of Devonald when considering the teachings of Zhang.

Appellant's argument: at page 14 of Brief - The rotors of Zhang² also undergo molecular conformational change via bond breaking and bond making.

Examiner's response: Narrow beats broad.

Appellant has not limited to rotors that do not undergo molecular conformational change via bond breaking and bond making.

Appellant's argument: at pages 14 and 15 of Brief - Examiner has not explained how to combine the materials of Zhang with the materials of Devonald.

Examiner's response: One does not need to combine the materials of Zhang with the materials of Devonald.

One of ordinary skill in the art would know to use compatible "seed molecules" and other materials to promote "molecular self-assembly" because that is pivotal to how all the species technologies of the genus work.

One of ordinary skill in the art would not be confused by disclosure of Devonald when considering the teachings of Zhang.

One of ordinary skill in the art would obviously not retain anything of Devonald that would be incompatible with the molecular self-assembly of Zhang because knowledge of such compatibilities is mainstream to molecular self-assembly technology.

Devonald teaches broadly the use of molecular self-assembly to produce stacking of multiple layers of like or alternate nature [Applicant's "seed molecules" and Applicant's three-dimensional molecular self-assembly] to produce any of a wide range of electrically and non-electrically tunable and switching optical devices [col. 9, lines 53-67].

Zhang teaches the missing material types, method step modifications, and rotor specific limitations with motivation of improved bi-stable switching with improved contrast. The result may be considered a modified Langmuir-Blodgett technique or it may be considered to contrast from traditional Langmuir-Blodgett techniques [lexicography]. Given that Zhang is enabled, one of ordinary skill in the art would have enablement and motivation for a successfully making a device with the rotors of Zhang that would be a modified three-dimensional multi-layerd optical device (and method) of

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Devonald, regardless of the lexicography of whether one wanted to refer to the technique as being a modified Langmuir-Blodgett's technique.

Appellant's argument: at page 15 of Brief - claims 13 and 29 are patentable because they contain electrode specific limitations.

Examiner's response: It is respectfully pointed out that one of ordinary skill in the art knows that two electrodes are needed and that they must be on opposite sides of the switching material. This very well known and intuitive fact is little more than an inherent property of electrical physics. That makes all of the very few possibilities for electrode locations very obvious with great expectation of success.

Appellant's argument: ISSUE 4, at page 16 of Brief - claims 33-40 are patentable because they depend from allowable base claims 1 and 17.

Examiner's response: Claims 33-40 are not patentable because they depend from base claims 1 and 17 that are properly rejected, and the limitations of claims 33-40 are also properly rejected.

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(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/TIMOTHY RUDE/

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